Unfortunately only a partial autopsy was permitted. The following is a report of the examination:

Crucial incision made over the sterno-clavicular articulation, the inner end of the clavicle was disarticulated and raised up. The under surface, for the space of an inch and a half was worn away smooth, involving about two-thirds the thickness of the bone, cup-shaped. The inner edge of the first rib, for the space of an inch and a half, was roughened.

The aneurism extended from a point an inch and a half above the clavicle, downwards, backwards, and to the left of the vertebral column for a distance of about eight inches. The trachea and œsophagus were crowded to the left. The antero-posterior diameter of this cavity was about four inches. It was estimated that the sac, after the clot was removed, would hold between one and two pints. The clot was laminated, and was three and one-half inches thick from the top to the cavity, which was filled with black, soft, clotted blood. This cavity would hold about two ounces. The carotid artery was impervious for the space of an inch. The subclavian was pervious for three-fourths of an inch, which was all that was removed. The vertebræ were not eroded, and did not suffer from pressure. The trachea was not diminished in calibre. The carotid and subclavian arteries emerged from the sac on the posterior surface, separated, showing that the aneurism involved the innominate artery.

The above case seems worthy of record as an instance of great relief to painful symptoms, and a positive prolongation of life in a disease necessarily fatal. An aneurism of the innominate with a sac, estimated at the autopsy to be of the capacity of one or two pints, and filled by laminated fibrine to such a thickness as to have a cavity of two ounces only, is interesting in connection with the treatment of aneurismal affections in other localities. It can hardly be doubted that the treatment prolonged life and gave great relief to the sufferer—more than that could hardly be expected in such a locality, as no counter-pressure is available to prevent the expansion of the sac inwards and downwards. Whether galvanic puncture or electricity in any of its forms would have done better is problematical. On the whole, iodide of potassa, with rest, pressure, etc., seems to be as promising as anything. Its mode of action is very uncertain. One would suppose that an excess of alkalinity would be far from desirable, but the assertion of Balfour, that no internal remedy holds out such prospect of relief, is quite in accord with the opinion of many of the best observers. He attributes its effect to its sedative action on the heart, combined with some specific effect upon the fibrous tissues, "by which the contraction of the sac is aided and its walls strengthened and condensed."²

OVER-DISTENSION OF THE RIGHT VENTRICLE, WITH A REPORT OF SIX CASES TREATED BY LEECHES.¹

BY F. C. SHATTUCK, M.D.,
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AN indispensable factor in efficient cardiac action is that each chamber of the heart should be able to propel onward all the blood which is delivered to it from behind, a proper balance of the circulation thus being

¹ Read before the Boston Society for Medical Improvement, March 28, 1887.

² Edinburgh Medical Journal, July, 1868.

maintained. The tendency of any block to the circulation of the blood, no matter what its cause, is to an over-accumulation of blood in the venous, a deficiency in the arterial system; and this tendency is, of course, more or less remote, according to the proximity of the block to the starting point of the systemic arterial circulation. Thus degenerative changes in the arterial walls, and lesions at the aortic orifice do not affect the lungs, the right heart, and the veins behind, as long as increased power in the left ventricle balances the increased work which it has to perform. If the left ventricle cannot respond to the heightened demands, or has lost the capacity for doing so which it possessed for a time, the mitral valve gives way, and we get, secondarily, much the same condition of things which we find, primarily, when the seat of the original block was at the mitral or tricuspid orifices, or in the lungs. The compensatory power of the left auricle is trifling; in the pulmonary circuit there is none, and the right ventricle is, therefore, the first and only chamber which can afford any real help. With primary and non-progressive lesions at the mitral orifice, the right ventricle is very often able fully to meet the extra demands upon it; and the individual may be quite unaware that he has any pathological anatomy about him for a few years, for many years, or for the course of his natural existence, death finally resulting from causes in no special way connected with his heart lesion or from old age.

Let us, however, suppose, as we see so often occur in practice, that the right ventricle fails in a case, let us say, of mitral stenosis: as a result, we have, first, pulmonary congestion, with, perhaps, œdema, and then increasing stasis in the whole venous circulation, systemic and portal alike. The urine diminishes in quantity, and acquires the other characteristics of passive congestion of the kidneys; the liver swells and extends below the ribs; the gastric and intestinal mucous membrane is congested, and digestion is impaired to a greater or less degree; serous transudation takes place into the subcutaneous cellular tissue, and into the great serous sacs of the pleura and peritoneum, more rarely into the pericardium; cyanosis shows the surcharge of the blood with carbonic acid and other excrementitious matters.

As the distension of the right ventricle increases, the tricuspid valve becomes incompetent from dilatation of its ring of insertion; and we then have, in addition to the other evidences of venous stasis before enumerated, they, at the same time, perhaps, reaching a higher degree, a systolic reflux of blood through the right auricle into the caval and tributary veins, as far as their valves. The liver then pulsates synchronously with the heart, and the jugulars are distended, their valves standing out prominently, or even pulsate, according to the seat of the valves, and whether they remain sufficient or not. To complete the picture of a high degree of over-distension and incompetency of the right ventricle, gradual in onset, we have only to allude to the dyspnoea, the lividity, the frequent somnolency from carbonic-acid poisoning, the coldness of the extremities, the nose and ears, and to the feebleness of the pulse, which is often also irregular and intermittent. One source of danger must also be alluded to, though its existence must usually be a matter of inference, rather than of direct observation: I refer to thrombosis of the auricles and their appendages, especially of the right, whence arterial emboli may be derived.

The above-sketched state of things is not compatible with long or comfortable existence. In most cases it is impossible to remove the cause, and thus bring about permanent relief. The cause lies in structural changes, generally of the valves of the heart, which cannot be made good. Our efforts must, consequently, be directed toward establishing or restoring the compensation, that is to say, toward enabling the right ventricle to meet the demands upon it. This is to be done by either stimulating its power, or by lessening the demands, or by both at once. In the earlier and milder grades of muscular incompetency, when the congestion of the portal system is absent or slight and digestion remains good, stimulation by heart tonics, combined with some moderation in the demand for heart power — rest and diet, with, perhaps, purgation — work to a charm. A proper balance of the circulation is struck anew, and everything goes on well again for a longer or shorter time. In the higher grades of the condition, however, when portal congestion is great and the digestion much impaired, the usual means of stimulating the ventricular contractions fail us, partly by reason of impaired absorption, partly of sluggishness of the nervous centres, partly of feebleness of the muscular wall. Under these circumstances, mechanical relief is what is wanted, what is imperative. If a portion of the load can be lifted from the right ventricle, it may be able to recover itself; otherwise, not. The withdrawal of fluid from the pleura or peritoneum is an indirect means of lifting a portion of the load, too indirect for extreme cases. The serum is outside of the circulation, and its withdrawal aids the circulation only by permitting greater functional activity of the abdominal organs or of the lungs, or by allowing serous transudation anew, and thus diminishing the mass of the blood in the veins. Free catharsis is another means, less indirect than aspiration, as the serum is derived immediately from the blood in the portal system. But it may be difficult to produce catharsis, on account of the failure of the gastric mucous membrane to absorb. We may wish, moreover, to avoid the fatigue incident to copious intestinal discharges, even when well managed. Direct means of lifting a portion of the load remains to us: the withdrawal of blood itself, either by venesection or by leeches. Much has been said and written of late years about the advantages of blood-letting in certain cases, but I do not think that we have yet reached, though we are approaching, the proper mid-position between the indiscriminate bleeding of sixty years ago, and the horror of bleeding which naturally succeeded.

There can be no question that, since the practice fell into desuetude, lives have been lost, and suffering has been endured, which might have been spared had blood been drawn. In the class of cases which I am considering the amount does not need to be large, as a rule. It is surprising how much relief follows the abstraction of as little as eight ounces, the right ventricle immediately recognizing the lessened demand, and the heart, as a whole, then responding to the stimulus of a cardiac tonic. The relief to the right ventricle allows improved circulation, and the nervous centres are in better condition to react to the drug which the stomach will now absorb. Active purgation is also often now desirable.

The choice as between blood-letting by venesection or leeching may be, but is not generally, vital. The

former is quicker, and, if it is desired to take a considerable quantity, then much preferable. But if eight or ten ounces are sufficient, a dozen leeches and a little poulticing will do the work, and there is less prejudice to overcome on the part of the patient and the friends. During the past year, I have employed or advised leeching in six cases of over-distended right ventricle, five in hospital, and one in private practice. These cases I will now report as briefly as possible, neglecting all features which do not have a direct bearing on the matter in hand.

CASE I. D., twenty-one years of age entered the Massachusetts General Hospital June 1, 1886 for mitral stenosis and regurgitation with ruptured compensation. Under rest and digitalis he improved at first; but became worse again, and July 1st, when I first saw him, he was suffering from orthopnea, vomiting, extreme cyanosis, cough, pain in the chest, ascites and anasarca. Jugular pulsation was well marked, the pulse was very irregular and intermittent, the temperature was sub-normal, and his condition was one of great gravity. The next day he was worse, and I ordered twelve leeches applied over the liver to be followed by tinct. *strophanthus* m.vi. t.i.d.

July 3d, the record states: The leeches took hold well and the bites bled for two hours after the animals fell off. Within two hours the patient was much relieved, the cyanosis was much less, the radial pulse and the heart-beat were synchronous, which they had not been before. The vomiting had ceased entirely, the temperature was normal.

July 4th. The *strophanthus* was omitted, as the pulse had fallen to 30. From this time on the improvement, though not uninterrupted, was marked. Before the end of the month he was in the yard daily, and August 6th he was sent to the Convalescent Home, after leaving which, he reported himself once at the hospital. He still had some cardiac symptoms, of course, but was up and about.

The daily amount of urine was, July 2d, 17 oz.; 3d, 19 oz.; 4th, 28 oz.; 5th, 112 oz.; 6th, 53 oz.

CASE II. M., eleven years of age, entered the House of the Good Samaritan, May 17, 1886, for mitral disease, the result of rheumatic endocarditis the previous winter. September 10th, she was sent to the Convalescent Home connected with the institution and stayed till November 20th, when she came back. Under absolute rest, careful feeding and digitalis, she improved for a time, but grew worse again.

January 31, 1887. She was vomiting everything she took; there was marked cyanosis and some ascites, anasarca, and hydrothorax; the jugulars and the liver were pulsating distinctly; the pulse was 120–130; the daily amount of urine had fallen to $\frac{2}{3}$ –3. Six leeches were ordered over the liver, and, with the subsequent bleeding, the amount of blood lost was estimated at $\frac{3}{4}$ viii. Immediate relief followed; the vomiting ceased, she had a good night, the next day the venous pulsation was scarcely to be seen, and she eat a good breakfast with relish. The amount of urine rose to 10 oz. on February 1st, to 9 oz. February 2d, 10½ oz. February 3d, 123 oz. February 4th, 60 oz. February 5th.

The pulse fell on the 3d to 90. It is only fair to state that on the 2d, she was ordered tincture of *strophanthus* m.ii. t.i.d. I do not doubt that this drug contributed to the diuresis and continued improvement, but from my experience with other cases I am per-

sued that without the previous leeching it would have been useless. Since then I have pushed the strophanthus up to mvi, t.i.d., the pulse remaining at 108 all the time. There was an interval of a fortnight between the time the strophanthus was omitted and resumed.

The child is now up and dressed all day, and is steadily improving in weight and strength. I believe that her life was saved by the leeches.

CASE III. September 23, 1886, I had the pleasure of accompanying Dr. C. F. Folsom in his visit at the City Hospital, and there saw the following case, the records of which have been most kindly placed at my disposal by him. A woman, past middle age, had been for a fortnight in the hospital with mitral and aortic disease and a failing heart. She had orthopnoea, great cyanosis, œdema, jugular and hepatic pulsation. I suggested leeches as a palliative, and twelve were ordered. Their application, the record states, was followed by much relief to the patient, who said she could breathe deeper. The next day she was "very comfortable." The relief was, naturally speaking, in the light of the revelations of the autopsy, only temporary. It was, however, so real, that at her request she was again leeches thrice subsequently, October 4th, 22d, and December 8th. The animals themselves were very repugnant to her, as I am informed by the house-officer, but she craved the relief which they afforded her. Early in January, 1887, she died.

The pathological diagnosis was in part as follows: Aortic insufficiency, mitral insufficiency and stenosis, relative tricuspid insufficiency; hypertrophy and dilatation of the right ventricle and both auricles; chronic adhesive pericarditis with obliteration of the sac; double hydrothorax; embolic infarction of the lungs; venous engorgement of the lungs and abdominal organs, etc.

CASE IV. A well-nourished woman of about fifty entered the House of the Good Samaritan, December 23, 1886, with dyspnoea, cyanosis and dropsy, the result of mitral disease. There was also bloody expectoration which was attributed to embolic infarction of the lungs. There was great diminution in the quantity of the urine, and a feeble and very irregular pulse.

When I saw her the next day her condition was desperate, and I immediately ordered twelve leeches in the hepatic region with alcoholic stimulants. No noteworthy relief followed the leeching: the patient dying at eleven o'clock that night.

An autopsy was made sixteen hours after death by Dr. Fitz. Both ventricles, especially the right, were filled with soft clots; the right auricular appendage contained old thrombi; the heart was enlarged; the mitral valve admitted only one finger; the aortic orifice was somewhat diseased. The lungs contained several embolic infarctions of moderate size, old and recent, and were œdematous. The liver and kidneys showed chronic passive congestion. As I look back at this case I think I should have bled her from the arm. The symptoms had grown rapidly worse, and she could have well afforded twenty ounces or more of blood. The result might not have been different. The pulmonary infarction, though not very extensive, was an unfavorable factor in the case, and the auricular thrombosis was a potential source of fresh infarction. When I next meet with a case in which the symptoms are so urgent and have developed with comparative rapidity, the general nutrition of the patient

being good, I propose to bleed from the arm, on the spot, if allowed to do so.

CASE V. A gentleman, forty-five years of age, seen November 27, 1886, in consultation with Dr. A. H. Hodgdon, of Dedham, under whose care he had come that day. He had been in his room, mostly in bed, for weeks, with great dyspnoea and other symptoms dependent on cardiac failure. He had taken digitalis, but in what doses was not known, as he had been under homœopathic treatment. There was œdema of the lungs and right hydrothorax; the liver was distinctly felt two inches below the margin of the ribs; there was no anasarca or ascites. The amount and character of the urine had not yet been determined.

It was agreed that leeches should be applied, and that then elaterium and digitalis should be given.

I have not seen the patient since, but Dr. Hodgdon writes that the relief immediately following the leeches was slight, though the quantity of water increased. The day after the leeching, elaterium was given, acted well, and afforded marked relief. The patient has gained slowly but steadily ever since, but is still compelled to lead a very restricted life.

CASE VI. K., forty-seven years of age, entered the House of the Good Samaritan, November 7, 1885, with cardiac failure, dependent, apparently, on parietal, rather than valvular disease, and a urine indicating more than passive congestion. She was cyanotic and œdematous; there was some œdema of the lungs, and bloody expectoration, with pain in the chest, pointed to embolic infarction. From time to time she grew better, and then worse again.

February 6, 1886. The jugulars were pulsating; the dyspnoea and cyanosis were so great, and the pulse so feeble, that twelve leeches were applied, with great temporary relief. A hydrogne cathartic and digitalis were then given with success, and the patient expressed much gratitude. Before long, however, the symptoms became grave, and March 16th she died.

The autopsy was made by Dr. Fitz, whose pathological diagnosis was as follows: Chronic interstitial myocarditis; dilatation and thrombosis of the heart; thrombosis of the pulmonary artery; chronic obliterating pleurisy; chronic passive congestion of the lungs, liver, spleen, kidneys, and uterus; chronic interstitial nephritis; chronic gastro-intestinal catarrh.

This is a complete list of the cases in which I have, as yet, used leeches as a means of rapidly diminishing the blood-mass, and thus acting directly on the right ventricle. Case IV received no benefit, but my only misgiving is that enough blood was not drawn. Cases III and VI were greatly relieved for a time, but succumbed to disease, which, post-mortem examination showed, admitted of nothing more than temporary palliation. Of the other three cases, two are known to be alive; the third (I) has been lost sight of. Of these three, two (I and II) would, in my opinion, not have lived more than a few days if I had not drawn blood. Some of the impressions which one receives at the bedside are difficult to convey to others in words. The change which I saw in some of these cases from one day to the next is deeply fixed in my mind, and, I think, also in the minds of the other gentlemen, and of the nurses who were watching the cases.

In short, when the right ventricle is gorged with blood, the leading indication is often to withdraw blood from behind, alcoholic stimulants being given simultaneously by the mouth, or under the skin, as

the features of each case demand. The way is thus prepared for purging and cardiac tonics, which, without the previous relief to the circulation, are quite ineffectual in many cases. In conclusion, I wish to express my obligation to Dr. Broadbent, of London, whose article on "Mitral Stenosis," in the *American Journal of the Medical Sciences* for January, 1886, led me to give more serious thought to the procedure which I have had the honor to lay before you.

REPORT OF PROGRESS IN ORTHOPEDIC SURGERY.

BY E. H. BRADFORD, M.D., AND R. W. LOVETT, M.D.

LATERAL CURVATURE.

SIGFRED LEVY¹ holds that there are two distinct etiological factors in the production of habitual scoliosis: one, "an anomaly of nutrition," a purely organic matter; secondly, certain mechanical causes — faulty positions of standing and sitting. Neither one of the factors can cause it alone; both must be present at the same time. In support of this view, he speaks of a case which he saw, where a girl of three years had a resection of the knee, and grew up with one leg nine centimeters shorter than the other. The pelvis was always tilted, but there was no suspicion of scoliosis until she was twelve years old, when she began to have headache, pain in the side, malaise, etc., and in spite of all precautions, a typical lateral curvature rapidly developed. He has seen three other such cases; and in over a hundred cases of habitual scoliosis which he has observed, in every case symptoms of general disturbance (as in the case related above) accompanied the development of the deformity.

CONGENITAL DISLOCATION OF THE HIP.

Motta² advocates a simple method of treatment, which, he says, gives "an immediate correction, or, at least, a decided lessening of the limp." The patient is suspended, as if a plaster-jacket were to be applied. If it is a unilateral dislocation, the shortened leg is drawn forcibly downward, and a plaster-mould of the whole side is taken, reaching from the axilla to the knee. From that a poro-plastic felt splint is made, which laces up, and is worn during the day. At night, extension is continued by a gaiter and attached weight, and the felt splint is applied in the morning, before the weight is removed. The treatment for double dislocation is simply a repetition of the same process on the other side.

COLD ABSCESSSES.

Garrè³ searched very carefully for tubercle bacilli in the pus from thirty cold abscesses, from different patients, but he only found them in a very small proportion of these cases. From attempts at cultivation from the pus in the class of cases where bacilli were not present, he got negative results; but inoculations of this pus in animals gave a typical tuberculosis, with many bacilli, and led to the inference that tubercle spores must have been present in the original abscesses. From this, Garrè concludes that the conditions necessary for the development of tubercle bacilli from their spores exist only in the living organism.

¹ Sigfred Levy. Ugeskrift for Laeger, October, 1886.

² Margary Motta. Estratto dal Giornale della R. Acad. di Med., t. 1886, numeri 7-8.

³ Deutsche Med. Wochenschrift, 1886, No. 4.

DEFORMITIES AND ARRESTED GROWTH.

Nicoladoni⁴ describes a case of manus vara and a case of manus valga, where the deformity was due to an injury of the epiphysis of the radius in one case, and of the ulna in the other, and a consequent arrest of growth. He then relates the case of a young man who received an injury of his knee-joint, and where, for nine years, the knee had been flexing more and more, by degrees. This thigh was ten centimeters shorter than the other, and his leg nine centimeters shorter. Two similar cases of Billroth's are related, and all are considered due to premature synostosis of the lower epiphysis of the femur, consequent upon injury. The reviewer of Nicoladoni's article, Roser, says that in all three cases there was a latent tuberculosis, and a consequent fixation in slight flexion, which was increased by walking about on the leg. Nicoladoni next considers the asymmetry of the head in torticollis. It affects only the upper jaw and base of the skull, while the lower jaw and vault of the skull are alike on the two sides, and he shows that it is a deformity due to the unequally disposed weight of the head. The scoliosis accompanying torticollis is purely the result of holding the head sidewise, a compensation entirely mechanical. He closes by giving an account of the examination of the vertebral column from a case of rachitic lateral curvature, where ossification had gone much further in the parts of the vertebræ on the convex side of the curve.

TRACTION IN CLUB-FOOT.

The most important article for some time on the subject is furnished by Shaffer,⁵ who writes of the use of traction, and describes the two shoes which he uses for this treatment. The two shoes are the outgrowth of the antero-posterior traction-shoe, and the simple, lateral pushing-shoe already described by him. The principle involved is as follows: The centre of motion in flexion and extension of the foot is not at the ankle-joint, but just below it. Therefore, in passing from extension to flexion of the foot, the heel rotates downward and forward, the toe upward and forward, and the astragalus upward. In short, the heel rotates downward, and the neck of the astragalus upward, around the transverse centre of antero-posterior motion at the ankle-joint. In criticism of the conventional forms of apparatus, he says: "The point at which the retaining force or counter-pressure is made (the neck of the astragalus) must also rotate around the pivotal point." When, therefore, motion is attempted with this apparatus under these conditions, the foot cannot follow the mechanical law of antero-posterior motion, and the heel cannot be carried downward and forward. The antero-posterior traction-shoe (for talipes equinus) consists of a calf band and two uprights, with a heel-cup and sole-plate. Antero-posterior motion of the shoe can be obtained at the ankle by an endless worm and screw moving the whole foot-piece, and controlled by a key. At a place corresponding to the medio tarsal joint, the sole-plate is divided transversely, and the two parts, anterior and posterior, are connected by a traction-rod, with ratchets, worked by a key under the heel-cup. Two webbing straps are applied to the foot: one over the astragalus, and one around the heel. They cross each other, and the ends of the former are fastened to the

⁴ Centralblatt für Klin. Chir., No. 10, 1887, p. 184.

⁵ N. M. Shaffer. New York Medical Journal, March 5 and 12, 1887.